

UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY

FOREST INSECT INVESTIGATIONS

EXPERIMENTAL SPRAYING FOR CONTROL OF THE
SPRUCE BUDWORM IN THE CODY CANYON
SHOSHONE NATIONAL FOREST

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March 24, 1930

EXPERIMENTAL SPRAYING FOR CONTROL OF THE SPRUCE BUDWORM
IN THE CODY CANYON, SHOShONE NATIONAL FOREST

INTRODUCTION

An outbreak of the spruce budworm within the Douglas fir forests of the Cody Canyon, Shoshone National Forest, was first recorded in July, 1922. Since that time the rather incipient outbreak has developed into a severe epidemic and now covers a tremendous area. The Cody Canyon provides one of the most popular and beautiful entrances to the Yellowstone Park. The beauty of the rugged mountainsides, which rise from the Shoshone River for thousands of feet, depends upon the dense forests of Douglas fir for a proper setting. Large areas of trees have already been destroyed, and unless checked the natural beauty of this region will be materially reduced, and the attractiveness of the many dude ranches located within the region destroyed.

In 1929 an appropriation of \$300 was made available to the Shoshone National Forest for the institution of an experimental spraying operation in order to test the effectiveness of this method of control against the spruce budworm. This experiment covered a two-fold purpose, for in addition to testing the effectiveness of the spray it was desired to determine the possibility of adapting forest fire pumps to the spraying of forest trees.

DESCRIPTION OF EQUIPMENT USED

The equipment used in conducting this experiment was an Evinrude fire pump, 150 feet of half-inch rubber hose, a small sized Worthley nozzle, a pressure controller, or by-valve, two 55-gallon oil barrels, and a two-inch suction hose.

The spray was mixed in the oil barrels and agitated by hand. The spray was drawn from the barrels and pumped through the pressure or bivalve into the spray hose. A short hose was attached to this valve which permitted excess liquid to be pumped back into the barrel which assisted somewhat in keeping the mixture agitated. This valve, though supposed to be automatic in character, could not be adjusted sufficiently fine in order to secure the maximum pressure from the motor and still trip quick enough to prevent the motor from stalling the instant the nozzle was closed. It was therefore necessary to operate this valve by hand in order to get the maximum pressure and prevent the constant stalling of the motor.

Though no gauges were available it is believed that the maximum pressure secured was not more than 125 pounds at the pump. The nozzle pressure would, of course, be a great deal lower, depending upon the length of hose used and the height of the lift between the pump and nozzle. With little or no lift the maximum height of stream secured with this equipment was seldom more than 50 feet. The pressure was so low that the stream would not break into a mist or fog, resulting in a washing of the foliage rather than a spraying. As many of the

trees treated were at least 100 feet in height it was very apparent that satisfactory results could not be secured from such equipment as the upper portion of the crown is always the more heavily attacked.

Considerable difficulty was experienced in mixing the spray solution in the barrels; in fact, it seemed nearly impossible to keep the mixture properly agitated and the oil from rising to the top. The outfit could properly be called "hay wire" as it was cumbersome, difficult to move, slow of operation, and not at all adapted to the spraying of tall forest trees. In cases of emergency it could be used very economically and effectively for treating small trees, as for close spraying the spreader could be used, which gave satisfactory results.

RESULTS OF SPRAYING

As the small overwintering larvae burrow into the new buds as soon as they start to swell in the spring, the task of destroying this insect with a stomach poison is a difficult one. It is possible that a dormant spray could be developed that could be applied in the fall or early spring which would prevent the initial attack by the bud-burrowing larvae, though such a spray is not available at this time. In planning this operation it was very evident that if satisfactory results were to be secured through the application of a lead arsenate spray before a substantial injury to the trees had occurred, it was necessary that it be applied just as the buds had fully opened

and all needles were exposed. If applied prior to that time very little, if any, results would be secured; and as the treatment is postponed subsequent to the opening of the buds the injury to the new foliage is increased. As the development of the trees varies in different portions of the canyon, exposures, etc., some difficulty was experienced in finding areas which showed the new growth to be in a proper condition for treatment.

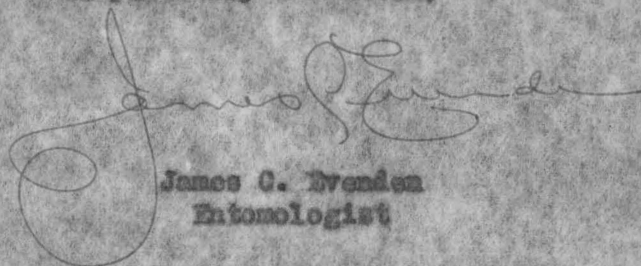
For the treatment of the trees lead arsenate was used in ratio of 1 : 12, and 1 : 16 gallons of water, with one pint of fish oil for each 50 gallons of solution. A better coverage was secured with the stronger solution, though it was not at all uniform due to the washing effects of the low pressure stream, as well as the absence of the mist or fog necessary for satisfactory coverage, that is secured with higher pressures. A very satisfactory destruction of the feeding larvae followed this operation on trees where the buds had been fully opened. The coverage secured was not at all satisfactory and many larvae escaped due to the fact that they were concealed in a case of needles that had not as yet opened and into which the spray did not penetrate.

An examination of these trees later in the season showed very little beneficial effects of the spray. This is explained by the fact that the larvae dropped from the upper untreated portion of the crown to the sprayed foliage from which the poison had been washed by rains, or else were blown or migrated from untreated trees adjacent.

CONCLUSIONS

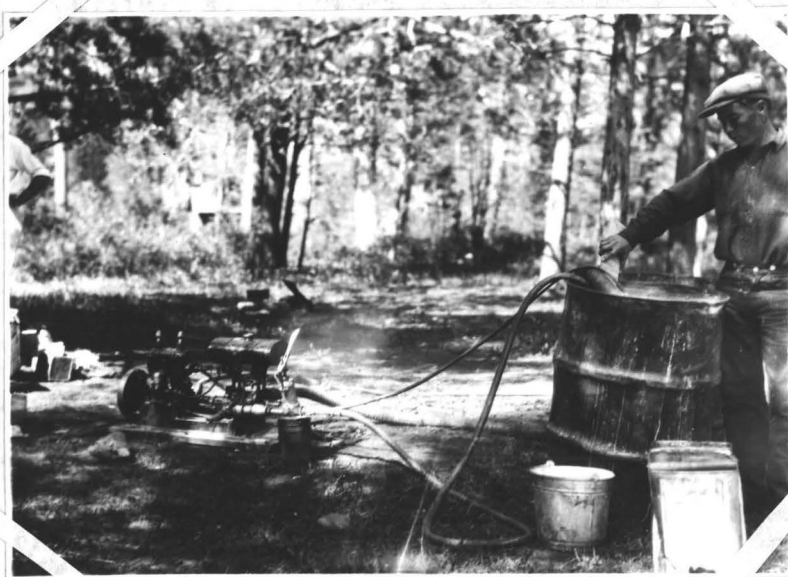
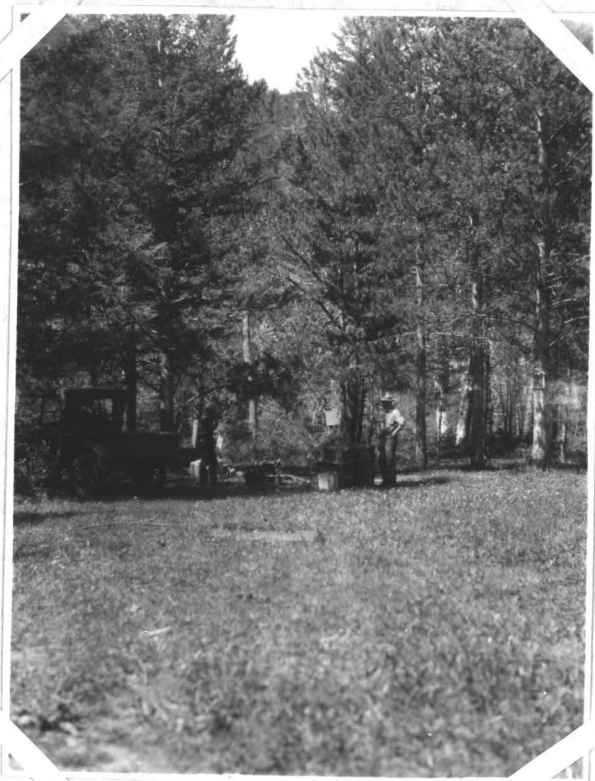
Though it is fully realized that this insect is a difficult one to destroy through application of a stomach poison, it is believed that if the spray is applied at a proper time outbreaks of this insect in Douglas fir can be controlled. It is sincerely believed that the seriousness of the problem within the Gody Canyon warrants the institution of another experimental spraying operation on an extensive scale, in an effort to preserve as much of the natural beauty of the region as possible. Spraying equipment adapted to the treatment of tall forest trees should be secured and the area treated should be of sufficient size so that the results secured can be more accurately determined.

Respectfully submitted,



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ADAPTION OF EVINRUDE FIRE PUMP FOR SPRAYING

Showing pressure valve, arrangement of hoses to prevent waste from the pressure valve and motor cooling system, method of mixing spray, and the height of the trees that could not be reached by the spray.